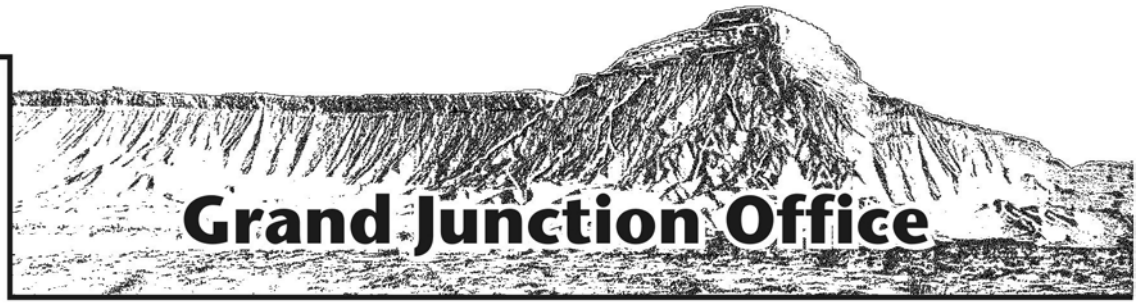
GJO–HGLP 1.8.2
Revision 0

Hanford Tank Farms Vadose Zone Monitoring Project

Health and Safety Plan

May 2003



U.S. Department of Energy

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Hanford Tank Farms Vadose Zone Monitoring Project

Health and Safety Plan

May 2003

Prepared for
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Prepared by
S.M. Stoller Corp.
Grand Junction Office
Grand Junction, Colorado

Work performed under DOE Contract No. DE−AC13−02GJ79491.

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RAS Health and Safety Plan

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1.0 Introduction

1.1 Background

The U.S. Department of Energy (DOE) Office of River Protection (ORP) has tasked the DOE Grand Junction Office (GJO) and its prime contractor, S.M. Stoller Corp. (Stoller), with the Hanford Tank Farms Vadose Zone Monitoring Project in the single-shell tank farms at the Hanford Site near Richland, Washington. This health and safety plan (HASP) has been prepared and issued by Stoller. Throughout this HASP, Stoller will be referred to as the GJO contractor.

Routine gross gamma logging of monitoring boreholes (drywells) surrounding single-shell tanks (SSTs) was conducted between the early 1970s and 1994. The purpose of this monitoring program was primarily to detect leaks originating from the SSTs. The program was discontinued in 1994, and no comprehensive monitoring has been performed since that time.

In fiscal year 2000, the GJO contractor completed a baseline characterization of the radionuclide distribution in the vadose zone surrounding the SSTs utilizing existing boreholes. With the baseline data as a reference, comparisons can now be made with any future measurements of comparable data quality collected in the same boreholes.

The Hanford Tank Farms Vadose Zone Monitoring Project is designed to identify changes in the vadose zone by comparing newly acquired log data with the baseline data (DOE 2003b). A faster spectral gamma logging system, known as the Radionuclide Assessment System (RAS), has been designed that is capable of routine, rapid response monitoring of boreholes. Using this system or equivalent, long-term monitoring can be performed to investigate the stability of contamination in the vadose zone.

1.2 Site Description

Plutonium processing at the Hanford Site produced large quantities of high-level nuclear waste. From approximately 1943 to about 1987, large underground SSTs were used to store millions of gallons (gal) of high-level radioactive wastes. These tanks are located in the 200 East and 200 West Areas of the Hanford Site (see Figures 1-1, 1-2, and 1-3).

The SSTs are steel-lined concrete tanks that were constructed between the 1940s and the 1960s. Sixteen of these tanks have individual capacities of about 55,000 gal, and 133 tanks have individual capacities that range from 530,000 to 1,000,000 gal. DOE-ORP estimates that 68 of the 149 SSTs have leaked in the past, releasing approximately 1,000,000 gal of high-level mixed waste into the vadose (unsaturated) zone sediments surrounding the tanks. In 1980, the addition of waste to the SSTs was halted, but the tanks continued to store waste.

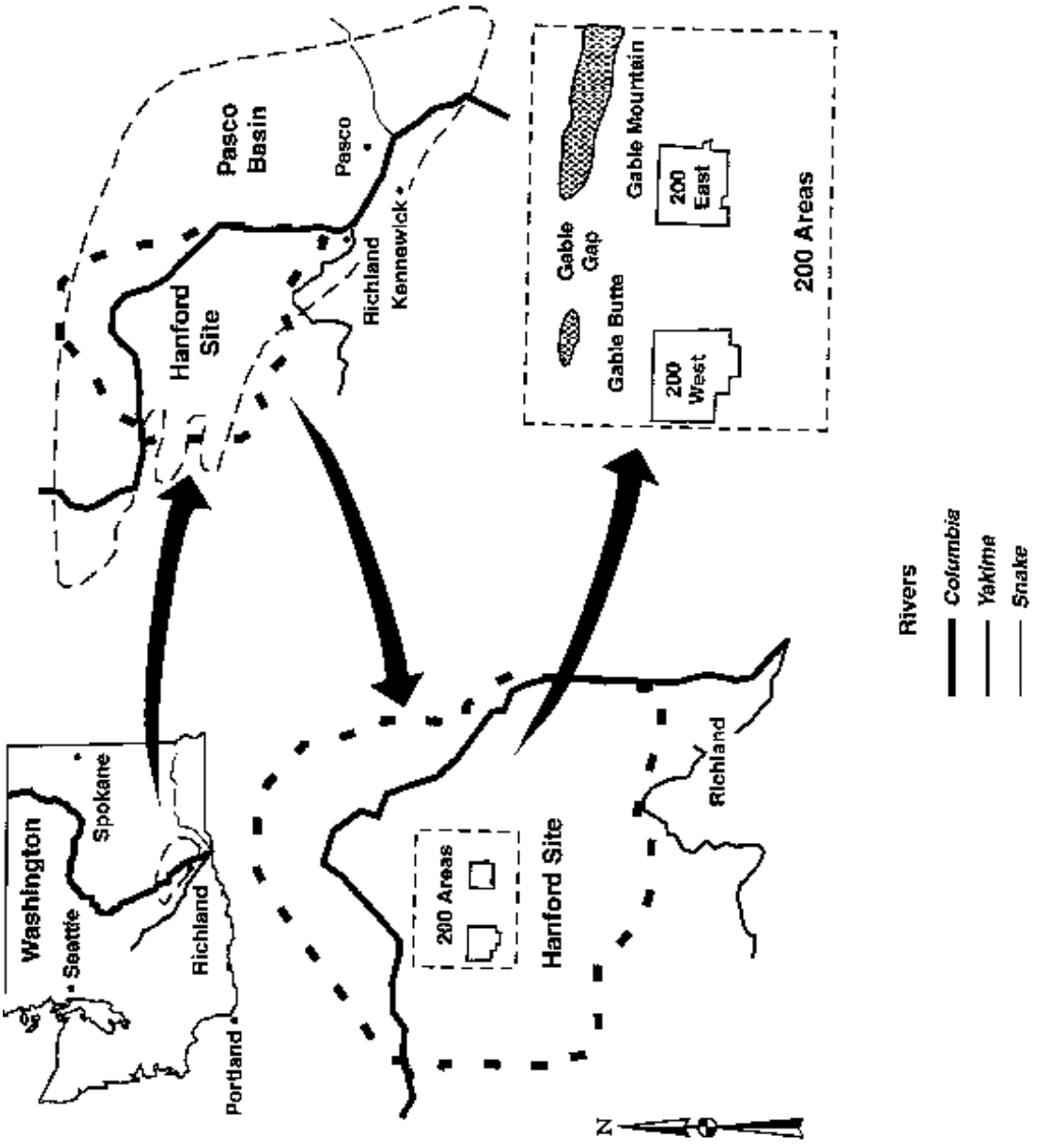

Figure 1-1. Location Map for the Hanford Site and 200 Areas

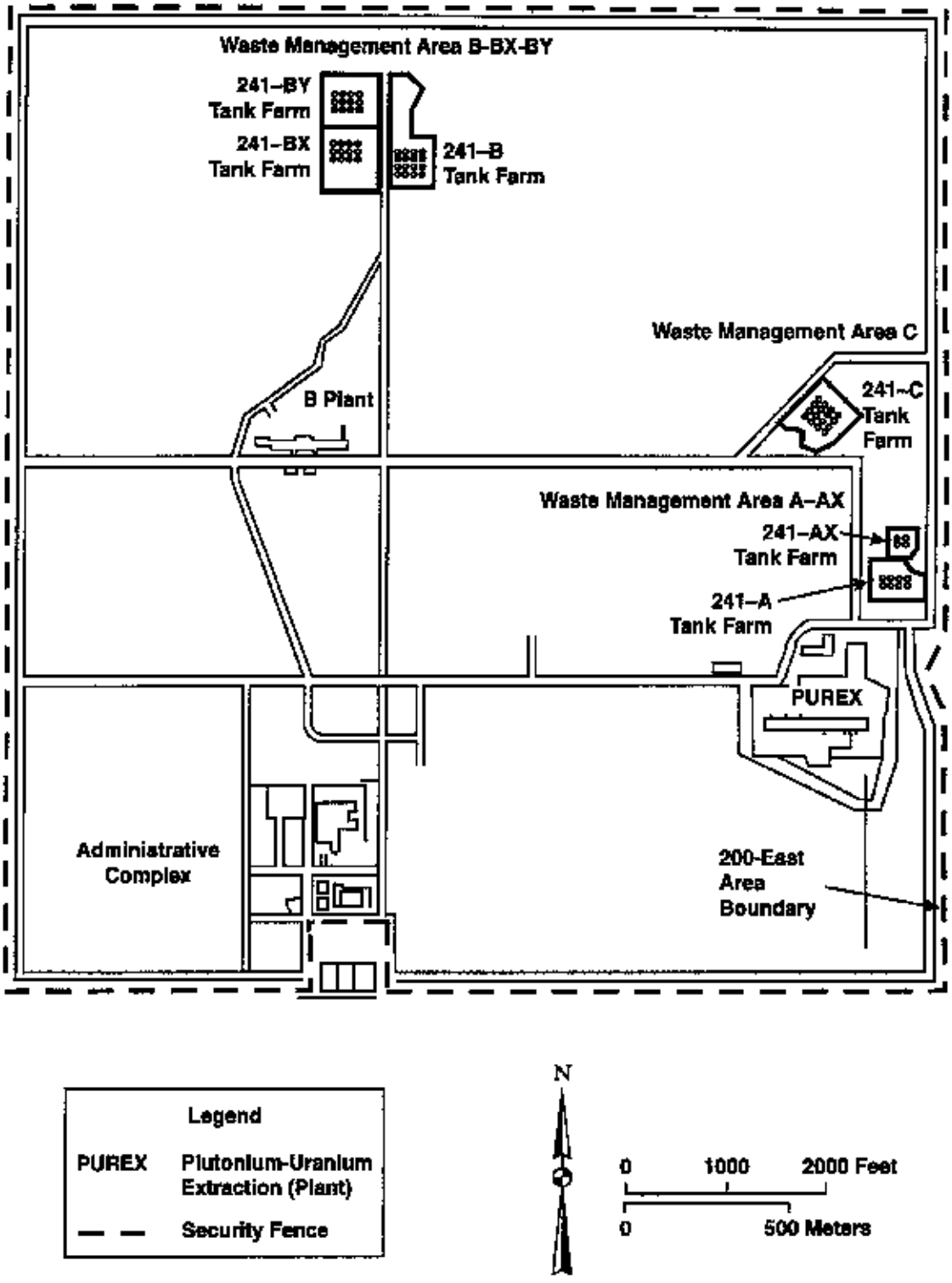

Figure 1-2. Location Map for the 200 East Area Single-Shell Tank Farms

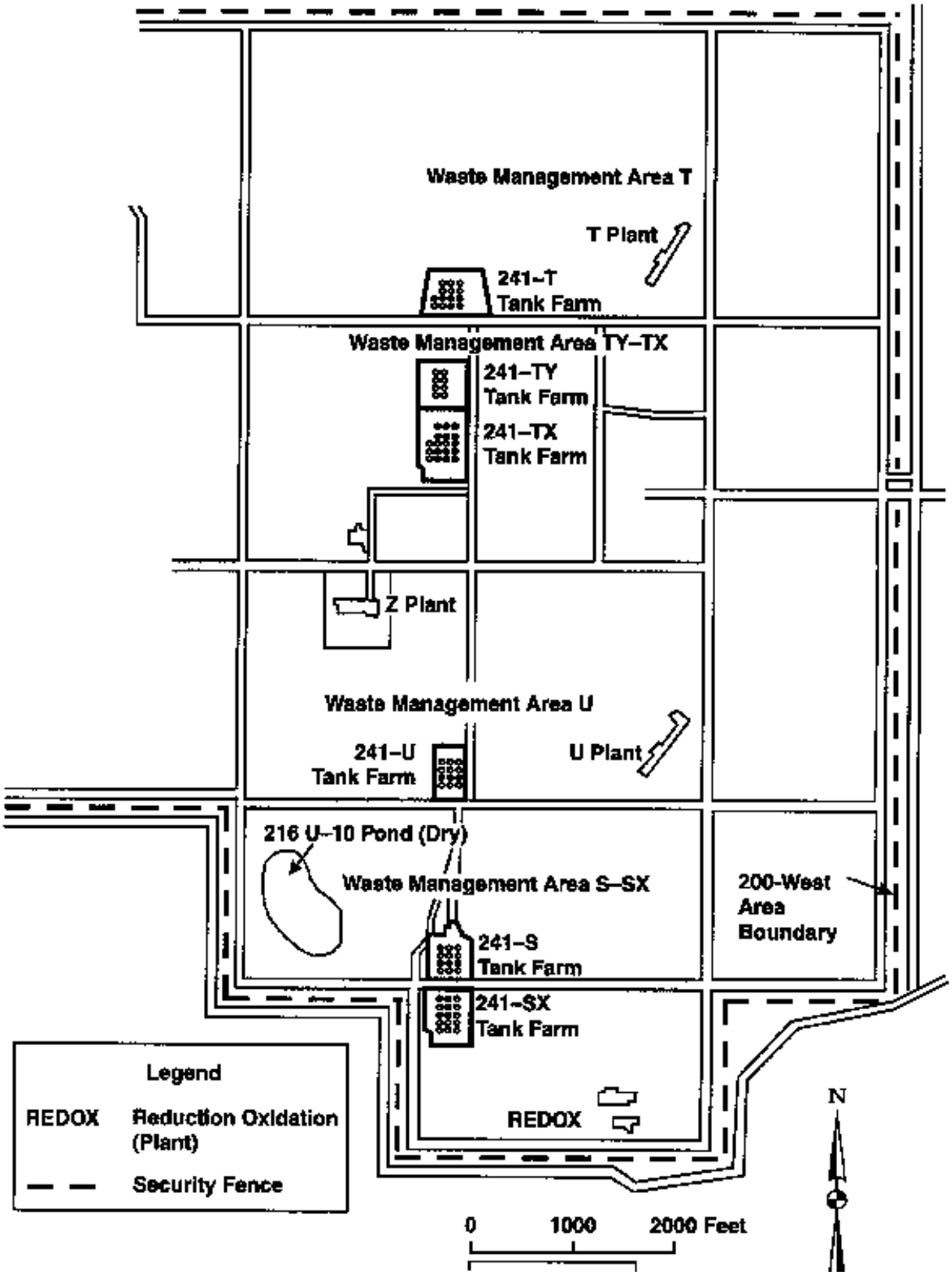

Figure 1-3. Location Map for the 200 West Area Single-Shell Tank Farms

Until the waste is removed from the SSTs, it must be properly managed to minimize releases to the environment. Decisions must be made about what to do with the current contamination in the vadose zone. Information is needed for current tank management decisions and for long-term tank-waste disposal and closure. This monitoring program at the Hanford Tank Farms will provide that information.

1.3 Scope of Work

The Hanford Tank Farms Vadose Zone Monitoring Project involves logging existing vadose zone monitoring boreholes with spectral gamma logging equipment. The data acquired during this monitoring project will be compared with baseline data acquired during the Hanford Tank Farms Vadose Zone Characterization Project to monitor for indications of contaminant movement.

The logging unit, referred to as the RAS, was constructed to perform this logging. The RAS is installed on a diesel-powered pickup truck. Electrical power is supplied by a power inverter, which is connected to the truck battery and alternator. The winch and sheave wheel control the cable that suspends the gamma-ray sensor package, or sonde, in the borehole. The cable supplies the sonde power and carries signals between the sonde and a computer in the pick-up. The RAS utilizes three sodium-iodide (NaI [Tl]) detectors; a very large (3-in. by 12-in.) detector for measuring background levels of contamination, a medium (1.5-in. by 2-in.) detector for measuring low levels of contamination, and a small (1-in. by 1-in.) detector, which has been shielded with a lead collimator to provide a lateral view of the borehole. Each detector is housed in a separate sonde. A detector sonde is then attached to the telemetry sonde, which attaches to the logging cable.

In a typical operation, the sonde is lowered to the bottom of the borehole and the gamma-ray data are collected as the sonde returns to the ground surface. The sonde typically moves at a rate of 1 ft/min, collecting data at 0.5-ft intervals. The particular depth interval that will be logged and frequency of log events are specified in the monitoring plan (DOE 2003b).

The RAS was designed for use by the Hanford Site Contractor's (HSC) operations staff. GJO contractor personnel will be responsible for: 1) limited oversight of the logging activities; 2) data handling, processing and reporting; and 3) repair, maintenance, and calibration of the logging system equipment and associated electronics. Occasions may arise that would require GJO contractor personnel to operate the RAS.

1.4 Scope of Health and Safety Plan

This HASP describes the hazards and the overall health and safety requirements for GJO contractor personnel engaged in vadose zone monitoring for the Hanford Tank Farms. HSC personnel engaged in these activities will adhere to the Hanford Site Contractor's Tank Farms HASP (DOE 1999). Activities will be conducted under the controls contained in the Hanford Site Contractor's Tank Farms HASP (DOE 1999), approved Hanford Site Contractor health and safety procedures, and 29 CFR 1910, "Occupational Safety and Health Standards."

1.5 Health and Safety Plan Page Changes

The information in this HASP will be maintained current with conditions at the work site. Changes to this HASP will be completed according to the *Grand Junction Office Health and Safety Manual* (GJO 2). A document revision will be issued to amend the information or requirements in this HASP. No other mechanisms (pen and ink line outs, Program Directives, etc.) are authorized for use in amending the information or requirements of this HASP.

1.6 Records

The GJO contractor forms referenced throughout this HASP are to be completed as necessary to record completion of training, medical surveillance, occurrence reporting, and other requirements. CH2MHill Hanford Group (CHG) Site forms will be used as necessary.

The Project Manager will make the determination to acquire specific records generated by non-GJO contractor individuals or organizations in support of GJO contractor work. This may include records generated or maintained by non-GJO contractor individuals or organizations for GJO contractor employees (e.g., Health and Safety records). Transfer of these records from non-GJO contractor subcontractors will be according to the project working file index. The Project Manager will identify records critical to the project, and copies of these records will be made available through the appropriate HSC. The GJO contractor may accept original records or record copies from non-GJO contractor sources. In either case, records will be evaluated before acceptance to the central file station.

2.0 Key Personnel

2.1 Organizational Structure

Table 2-1 provides a listing of DOE, GJO contractor, and HSC personnel that support or will implement the Hanford Tank Farms Vadose Zone Monitoring Project.

Table 2-1. Project Management and Support Personnel

POSITION	NAME	PHONE EXT.
Stoller Task Order Manager, GJO	Mike Butherus	(970) 248-6332
Project Manager, GJO	W.D. Steele	(970) 248-6703
Project Coordinator, Hanford	Steve Kos	(509) 376-6432
Technical Lead, Hanford	Rick McCain	(509) 376-6435
Technical Lead, GJO	Carl Koizumi	(970) 248-7797
Office Administrator, Hanford	Jill Meinecke	(509) 376-6454
Health and Safety Manager, GJO	Michael Hurshman	(970) 248-6468
CHG Hanford Site Safety	Kevin Sheffield	(509) 372-0108
DOE/GJO Contracting Officer's Representative	Mike Tucker	(970) 248-6004
DOE-ORP/RPP Project Manager	Robert Yasek	(509) 372-1270
DOE-RL Contracting Officer's Representative, Task Order Manager, Program Manager	John Silko	(509) 373-9876

2.2 Project Manager

The Project Manager has the responsibility for ensuring the overall Hanford Tank Farms Vadose Zone Monitoring Project complies with this HASP. Further responsibilities are to ensure the applicable health and safety and medical records are formally transferred from the HSC to Stoller.

2.3 Project Coordinator

The Project Coordinator is responsible and accountable for ensuring day-to-day activities at the Hanford Tank Farms comply with the requirements of this HASP. If any circumstances arise with the potential for the health and safety of any project personnel to be jeopardized, the Project Coordinator has the authority and responsibility to halt work until the situation can be adequately addressed.

In addition, the Hanford Project Coordinator is responsible for conducting pre-entry briefings and routine safety meetings (see Section 4.3). He or she will ensure the *Grand Junction Office Health and Safety Manual* (GJO 2), the HSC *Tank Farms Health and Safety Plan* (DOE 1999), and this HASP are available at the GJO contractor offices.

2.4 Office Administrator

The Stoller Hanford Office Administrator will serve as the training records contact with HSC Training Records.

2.5 Health and Safety

The HSC will supply health and safety coverage for project personnel. All personnel will follow the safety requirements contained in this HASP, the HSC *Tank Farm Health and Safety Plan* (DOE 1999), and *Project Hanford Radiological Control Manual* (DOE 2000). It is each individual's responsibility to actively pursue safe work practices for their own safety and for their coworkers.

2.6 Hanford Site Contractor Health and Safety Personnel

2.6.1 Office of River Protection (ORP) Safety Management

The ORP safety manager is responsible for ensuring close coordination between the tank farm and the organization for the purpose of maintaining a safe and healthful workplace. Other responsibilities include developing and implementing the Tank Farms HASP (DOE 1999) and auditing field activities, as appropriate, to verify compliance; ensuring the effective integration and involvement of safety and health professionals in daily tank farm activities to ensure hazards are identified and controlled; supporting the line organization in dealing with hazards and establishing safety and health requirements through the Standards/Requirement Identification Document (S/RID).

2.6.2 Office of River Protection (ORP) Safety Personnel

Personnel in the ORP safety organization are responsible for assisting tank farm management in defining and resolving safety and health issues; aiding in the communication of hazards to tank farm employees; providing evaluations of hazards and verifying compliance with the Tank

Farms HASP (DOE 1999); and assisting ORP personnel to ensure all designated health and safety procedures and requirements are properly implemented in the field.

2.6.3 Office of River Protection (ORP) Radiological Control

The ORP Radiological Control organization is responsible for monitoring radiological hazards, for providing radiological survey maps to support work planning/performance, for verifying compliance with established radiological procedures, and for invoking stop work authority for radiological hazards that could potentially jeopardize worker health and safety.

3.0 Hazard Assessment

Hazard assessment is an ongoing process. All personnel engaged in logging activities should maintain a questioning attitude about their personal safety and be aware of their surroundings and ongoing activities. Every attempt has been made to describe the hazards likely to be encountered at the Tank Farms and their prerequisite controls. However, should any hazards not previously identified and listed in this HASP be encountered, the Project Coordinator will ensure appropriate controls are enacted and this plan is amended as necessary.

3.1 Hazards List

The hazards presented in the following sections were identified by reviewing AJHA TF-1113, Rev. 0, and by experience gained from performing borehole geophysical logging within the Hanford Tank Farms.

3.1.1 Operational Hazards

Logging at the Hanford Tank Farms is a non-intrusive activity. A monitoring borehole is uncapped and a downhole probe containing a gamma-ray detector is lowered into the hole from a logging truck. This device measures the gamma radiation intensity from the surrounding soils and transmits signals to instrumentation in the logging vehicle. The instrumentation then provides radionuclide concentration information. The tasks, hazards, and controls of logging operations are presented in Table 3-1.

3.1.2 Radiological Hazards

The radiological conditions described below are based on discussions with HSC personnel and previous experience operating geophysical logging trucks within the tank farms.

The tanks at Hanford Tank Farms are underground; therefore, direct radiation exposure to personnel from high-level wastes stored within is minimized. No high radiation levels will be accessed during logging activities. Generally, the dose rates at the tank farms will be less than 2 millirem per hour (mrem/hr).

The majority of the tank farms are currently posted as Contamination Areas because of liquid and airborne releases of radioactive material that have contaminated the soil. The level of loose surface contamination at the tank farms ranges from nondetectable to greater than 20,000 disintegrations per minute per 100 cm^2 (dpm/100cm^2) on a direct measurement of the soil using a Geiger-Mueller type detector. Although major portions of the tank farms are not contaminated, a possibility of encountering contamination and prudent radiological controls require the use of PPE.

Areas at the Hanford Tank Farms exist that require respiratory protection or monitoring upon entry, exclusive of any work being performed. However, these areas are controlled because of

the chemical hazards rather than radiological hazards. Typically, respiratory protection has not been required in the areas where borehole logging takes place, with the exception of the C Tank Farm.

Table 3-1. Logging Tasks, Hazards, and Controls

Task	Hazard	Control
1. Select and train operators.	Operator respiratory or heart problems; other physical limitations. Untrained operator; failure to perform task.	Examination by industrial physician for suitability to work. Train operators or use experienced operators; dry run (Reference: National Institute for Occupational Safety and Health, Doc. #80-406).
2. Opening boreholes.	Biological (spiders, snakes, etc.); chemical.	Open with caution, stay upwind, visually inspect, and let vent; PID monitor for organic vapors; and explosometer monitor for lower explosive limits (LELs).
3. Position sheave, lower/raise detector into dry well.	Pinch points from cable pulleys or reel. Physical weight of probe (approximately 65 pounds).	Keep hands and fingers clear of moving cable. Leather gloves shall be worn when handling cable. Use proper lifting techniques, e.g., use legs instead of back, use two people to lift probe.
4. Operational check of probe.	Radiation exposure from check source.	Use as low as reasonably achievable practices; time, distance, and shielding.

3.1.3 Chemical and Other Hazards

A thorough description of the health hazards and hazardous substances, except radiological hazards, associated with the Hanford Tank Farms is detailed in the Tank Farms HASP (DOE 1999). The hazards and controls associated with work at the Hanford Tank Farms are presented in Table 3-2.

Table 3-2. Hanford Tank Farms Tasks, Hazards, and Controls

Task	Hazard	Control
1. Select and train operators.	Operator respiratory or heart problems; other physical limitations. Untrained operator; failure to perform task.	Examination by industrial physician for suitability to work. Train operators; use experienced operators, dry run (Reference: National Institute for Occupational Safety and Health, Doc. #80-406).
2. Donning PPE.	Spider or snakebite, scorpion, or bee sting.	Inspect PPE before donning.
3. Work within the tank farm.	Exposure to radiological contamination. Exposure to chemical hazards: ammonia, normal paraffin hydrocarbon, acetone, butanol, tributyl phosphate, formic acid, nitrogen oxides, hydrogen and acid gases (hydrogen sulfide, hydrogen cyanide, sulfur dioxide, sulfur trioxide, hydrogen fluoride), and others. Heat stress. Cold stress. Ambient Temp. < 30 °F. Evaluate Chill Temp. < 20 °F.	Wear PPE as prescribed in the radiation work permit (RWP). Wear PPE as prescribed by ORP Safety personnel. Borehole logging will not expose personnel to tank contents. Provide shade, use work/rest schedule as established in the *Heat Stress Control*, HNF-IP-0842. Drink plenty of fluids 20 to 30 minutes before the start of work. Dress appropriately within the guidelines permitted by the RWP. Reference HSC HASP. Reference HSC HASP.
4. Decontamination.	Spread of contamination.	Follow procedures as prescribed in HSC Procedures.

4.0 Training

4.1 Employee Participation

GJO contractor employees will not be permitted to participate in or supervise hazardous waste site operations that could expose them to hazardous substances or safety or health hazards until they have been provided training to a level required by their job function and responsibility.

Management and field personnel directly responsible for Hanford operations will complete required training as described in Table 4-1 as appropriate for the areas or facilities in which logging will be performed. Field personnel are responsible for reviewing and being familiar with project plans and procedures applicable to their job function, as directed by management.

4.2 Pre-Entry Briefing

The Pre-Entry Briefing training will be conducted by the Project Coordinator and assisted by the HSC. This training should include:

- Names of key personnel responsible for site health and safety.
- Safety, health, and other hazards present on the site.
- The proper uses of PPE.
- The approved standard operating procedure (SOP) and emergency response actions.
- The safe uses of engineering controls and equipment on the site.
- The medical surveillance requirements for the site.
- Site access controls.
- A review of the controls contained in the RWP.

Table 4-1. Training and/or Site Access Requirements

Training Course	Stoller Field Personnel	Stoller Project Coordinator	Stoller Office Personnel
Hanford Site Orientation/General Employee Training (HGET) (000001)	x	x	x
40-hour Hazardous Waste Site Training	x	x	
24-hour On-The-Job Supervised Field Training (031420)	x	x	
Annual Physical	x	x	
Annual Whole Body Count	x	x	
8-hour Manager/Supervisor Hazardous Waste Site Operation Training		x	
8-hour Hazardous Waste Site Refresher (032020)	x	x	
Basic Respiratory Training (020041)	x	x	
Quantitative Mask Fit (020044)	x	x	
Radiation Worker II (020001)	x	x	
Tank Farm Facility Orientation (350760)	x	x	
Building Emergency Plan Checklist (FEHIC) (03E060)	x	x	
Tank Farms Waste Handling, Segregation, and Packaging (350560)	x	x	
Site-Specific Pre-Entry Briefings	x	x	
Portable Fire Extinguisher Training	x		
Commercial Drivers License (well-logging vehicle drivers only)	x		
Hazardous Materials General Awareness Training (020075)	x	x	
Hazardous Materials Drivers' Training (020077)	x		
Defensive Driving (GJO requirement)	x	x	x
Intro to Fed. Motor Carrier Safety Regulations (020083)	x		

4.3 Safety Meetings

Weekly safety meetings will be conducted for the GJO contractor employees by the Project Coordinator. Topics discussed will be recorded in the field logbook for the particular logging system at which the safety meeting was held. Discussions will include:

- Health and safety considerations and necessary PPE for the current operations.
- Any revisions to the HASP or to the Tank Farm HASP (DOE 1999).
- All documented and/or observed unsafe acts committed on the site since the previous meeting and methods to prevent recurrence.
- Lessons learned.
- Evacuation routes and staging areas for the specific tank farm being logged.

The safety meetings will also be conducted whenever starting work at a new tank farm or when operational conditions change.

5.0 Personal Protective Equipment

5.1 PPE Selection Guidelines

The ORP safety personnel will evaluate the hazards identified for logging activities and for the monitoring borehole locations. If engineered safeguards or administrative controls cannot be used, the ORP safety personnel and Project Coordinator will implement the Respiratory Protection Program guidelines for choosing nonradiological respiratory protection to select PPE to protect employees from the known or potential hazards likely to be encountered in the Tank Farms. ORP Radiological Control will identify PPE requirements for radiological hazards via the RWP. Where PPE is necessary to address both chemical and radiological concerns, the ORP safety personnel, Project Coordinator, and ORP Radiological Control will jointly determine requirements.

Employees who are engaged in activities at the Tank Farms that require the use of PPE must meet all applicable training and medical surveillance requirements specified in this HASP and the *Project Hanford Site Radiological Control Manual* (DOE 2000).

If the level of PPE for the actual conditions is found to be inadequate after the borehole logging has begun, the Project Coordinator will be notified immediately and all affected activities will shut down until an evaluation is performed and approval to resume is granted.

PPE will be donned and doffed at the access control point. There will no eating, drinking, smoking, or chewing allowed in the tank farm. The exception is drinking water as a heat stress control measure in accordance with the *Heat Stress Control* (HNF-IP-0842).

The majority of the tank farms are currently posted as Contamination Areas, and typically Modified Level D PPE will be worn. Specific radiological PPE requirements will be contained in the RWP issued by ORP RADCON. Other PPE will be dictated by the Tank Farm HASP (DOE 1999). Typical components of PPE ensembles are listed in Tables 5-1, 5-2, and 5-3.

Respiratory protection will be worn as required by the RWP or by ORP safety personnel.

If ORP RADCON prescribes no PPE requirements in the RWP or as specified by the tank farm HASP (DOE 1999), then as a minimum, personnel will wear shirts with sleeves, steel-toed safety work shoes, and pants while engaged in well logging activities.

5.2 PPE Level Classifications

PPE is defined in this hazard analysis by letter designator based on the general level of protection afforded by the ensemble. Level D PPE is considered street or work clothes. Modified Level D and Level C are considered protective clothing ensembles for radiological or chemical hazards.

Level D

Basic work-clothing ensemble. Used as the minimum level of PPE for work at the site. Includes pants, shirt or cotton coveralls, and steel-toe safety boots. Level D may also include additional industrial safety PPE such as hard hats, gloves, safety glasses, or hearing protectors.

Modified Level D

Used during conditions requiring moderate dermal protection, excludes any respiratory protection. Includes protective gloves, non-permeable boots, and cotton or tyvek coveralls.

Level C

Used during conditions requiring moderate dermal *and* respiratory protection. Includes company-supplied protective gloves, non-permeable boots, Tyvek coveralls, and a properly selected full-face air-purifying respirator (APR).

Table 5-1. Level D PPE Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	No	
Head	No	
Eyes	Yes	Safety glasses as required.
Face	No	
Hands	Yes	Leather and/or cotton work gloves.
Arms	Yes	Employee-supplied long or short-sleeved shirt or company supplied cotton coveralls.
Trunk	Yes	Employee supplied long or short-sleeved shirt or company supplied cotton coveralls.
Legs	Yes	Employee supplied work pants or company supplied cotton coveralls.
Feet	Yes	Steel-toed safety shoes meeting ANSI Z41.1-75.

Table 5-2. Modified Level D PPE Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	No	
Head	Yes	Cotton or tyvek hood.
Eyes	No	Safety glasses when required.
Face	No	
Hands	Yes	Nitrile gloves. Leather or cotton gloves may be worn if skin abrasion or sharp edges are concerns.
Arms	Yes	Cotton or tyvek coveralls.
Trunk	Yes	Cotton or tyvek coveralls.
Legs	Yes	Cotton or tyvek coveralls.
Feet	Yes	Steel-toed safety shoes meeting ANSI Z41.1-75. Rubber overshoes will be worn over the work boots.

Table 5-3. Level C PPE Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	Yes	Full-Face APR with appropriate dust/chemical cartridges.
Head	Yes	Cotton or tyvek hood.
Eyes	Yes	Full-Face APR.
Face	Yes	Full-Face APR.
Hands	Yes	Nitrile gloves, leather or cotton gloves may be worn if skin abrasion or sharp edges are concerns.
Arms	Yes	Coveralls of Tyvek or similar material.
Trunk	Yes	Coveralls of Tyvek or similar material.
Legs	Yes	Coveralls of Tyvek or similar material.
Feet	Yes	Safety shoes meeting ANSI Z41.1-75. Rubber overshoes will be worn over the work boots; Bata Hazmax, Polyblend or Superpoly boots may be worn instead of work boots.

6.0 Temperature Extremes

6.1 Heat Stress

All fieldwork will be performed in accordance to the Heat Stress Program outlined in *Heat Stress Control* (HNF-IP-0842), for heat stress protection.

The Project Coordinator is responsible for implementing the requirements and work/rest guidelines established in the heat stress procedure.

6.2 Cold Exposure

All fieldwork will be performed according to the Cold Stress section of the Tank Farm HASP (DOE 1999).

The Project Coordinator is responsible for implementing the requirements presented in the Tank Farm HASP (DOE 1999).

A current, controlled copy of the Tank Farm HASP (DOE 1999) will be maintained in the office.

7.0 Medical Surveillance

In most situations, the medical surveillance requirements described in this section will be performed by the Hanford Environmental and Health Foundation (HEHF). The required medical surveillance records generated by HEHF will be formally transmitted to the GJO contractor.

7.1 Examinations

Standards and requirements for health assessments of employees and subcontractors are maintained according to DOE orders, 29 CFR 1910.20 Hazardous Waste Site Medical Surveillance, the *Grand Junction Office Health and Safety Manual* (GJO 2), and other applicable codes and regulations. Hanford Site forms will be used and approved sample protocols followed during employee and subcontractor medical examinations.

7.1.1 Initial Examinations

The initial examination satisfies two requirements. The first is the provision of baseline data. Subsequent physical examinations may then be compared with the baseline information to suggest physiologic trends. The second requirement is the determination of an individual's fitness for the job, including the ability to work while wearing PPE.

7.1.2 Qualification Physicals

Qualification physicals are required every year. The purpose of this physical is to qualify employees for job assignments with specific medical qualification standards or for medical surveillance. Medical surveillance is instituted for employees who:

- are or may be exposed to hazardous substances or health hazards at or above the PEL for 30 days or more a year,
- wear a respirator for 30 days or more, or
- are injured, become ill, or develop signs or symptoms because of possible overexposure.

Table 7-1 describes the medical surveillance requirements for the GJO contractor personnel working at the Hanford Tank Farms.

7.1.3 Exit Physicals

An exit physical is required at termination of employment with the GJO contractor. Content of the exit physical is based upon the time elapsed since the previous physical examination and the potential for exposure to toxic chemicals or hazardous physical agents.

Table 7-1. Medical Surveillance Requirements

Job Description	Initial	Annual Qualification[a]	Respirator	Heavy Metals	Asbestos	Exit Physical
Logging Engineer	x	a	x			x
Geophysicist	x	a	x			x
Project Coordinator	x	a	x			x

[a] An annual qualification physical required if the employee meets any of the three criteria listed in Section 7.1.2.

7.2 Injury/Illness Examinations

An injury/illness reexamination will be given if any of the following situations arise:

- An employee notifies the Project Coordinator that he/she has developed signs or symptoms indicating possible overexposure or sensitivity to the hazardous substances or health hazards on the site.
- An employee has been injured or exposed above the PEL or other published exposure levels in an emergency.
- An employee develops a lost-time illness of 3 working days or more.
- An employee sustains any injury.

If an injury/illness is the result of exposure to a hazardous substance or health hazard, the Project Manager, HEHF, and the Contractor Health and Safety Manager (GJO) will be notified of the substance or hazards suspected. The HEHF physician will specify the scope of the reexamination. The contract physician will complete a Physician's Recommendation for Return to Work after completion of the reexamination to certify that the employee is fit to return to work and, if necessary, specify any activity restrictions.

7.3 Contract Physician Information

The employee and the GJO contractor will supply the following information to the contracting physician:

- Any data relating to expected or known exposure levels to hazardous or radiological substances.
- A description of PPE expected to be used on work sites.
- A description of employee's duties as they relate to the employee's exposure.

- Any available information from previous medical examinations not readily available to the contract physician.

7.4 Medical Records

Personnel medical and exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.120 and the *General Administrative Procedures Manual* (STO-100), Section 3.0, "Records Management Plan," and this HASP. Employee confidentiality will be maintained to the extent permitted by law. Employees will be notified annually of the following:

- Status/results of medical examinations.
- The right to access medical records anytime.
- Where and how to access medical records.

7.5 Employee Responsibilities

The following responsibilities are applicable to personnel engaged in the Hanford Tank Farms Vadose Zone Monitoring Project:

- Report any work-related injury or illness immediately to line management, HEHF, and the ORP safety personnel.

8.0 Exposure Monitoring and Air Sampling

Radiological and chemical exposure monitoring and air sampling will be performed by the HSC as required. All personnel entering the tank farms will be issued thermoluminescent dosimeters (TLDs) and neutron dosimetry. Results of personnel exposure monitoring will be formally transmitted to the Stoller Richland office quarterly. The Richland office will forward any results from GJO-based personnel to the GJO office. GJO-based personnel are those persons who normally work in Grand Junction. Their exposure records are tracked through the GJO office. Exposure records of the Richland-based personnel are tracked at Hanford.

Before beginning logging at a tank farm, the GJO contractor personnel will contact the ORP safety personnel to receive a briefing on the potential hazards/exposures and verify assessed exposures. Past elevation and borehole logging experience have indicated significant exposures to logging engineers are highly unlikely. In the event observations indicate potential hazards may exist during logging activity, personnel will request support from ORP safety personnel to assess the situation.

The HSC monitoring program, as described in the Tank Farms HASP (DOE 1999) in the safe work practice (SWP) and monitoring sections, should be referred to for entry and specific respiratory protection requirements. A current copy of the Tank Farms HASP (DOE 1999) will be maintained at the work site.

Radiological surveys for entering or exiting radiological control areas will be performed as required by the applicable RWP by the ORP Radiological Control Technicians (RCTs). Personnel qualified for self-survey may survey themselves out of a radiological control area upon approval from HSC RADCON.

9.0 Site Control

9.1 Work Coordination

The Project Coordinator will coordinate with HSC shift office personnel to stay abreast of scheduled Hanford Tank Farm activities. The Project Coordinator will schedule well logging activities to ensure the GJO contractor personnel are not exposed to any hazards not addressed in this HASP.

9.2 Radiological Work Permits

A general RWP will be issued by ORP RADCON for GJO contractor personnel engaged in well-logging activities at Hanford Tank Farms. The RWP(s) will prescribe the PPE, dosimetry, and other radiological safety requirements. Typically, the RWP for logging activities will be valid for the calendar year. GJO contractor personnel will follow these requirements. The RWP may be revised periodically and must be reviewed/signed after each revision.

9.3 Access Control

Access control to Tank Farm areas containing radiological and chemical hazards is performed by the Access Control Entry System (ACES). ACES verifies entry requirements for individuals requiring access to Tank Farms radiologically controlled areas. Once entry requirements are verified, access is permitted and controlled.

Employees entering these areas are required to review the facility radiological status map and respiratory requirements and acknowledge understanding of the entry requirements, which are typically posted at the controlled area access point.

9.4 Vehicle Control

Vehicles may exit individual tank farms after routine monitoring for contamination. However, these vehicles will remain on the Hanford Site and under the radiological controls of ORP Radiological Control. Should eventual unconditional release of these trucks be necessary, a more thorough and extensive radiological survey may be required.

9.5 Safe Work Practices

9.5.1 Daily Inspections

The logging truck and equipment will be inspected daily, if the truck/equipment will be operated that day. As a minimum, the inspection will include the tires, brakes, cables, pulleys, and sheaves. Any defects discovered will be fixed prior to commencing logging activities.

9.5.2 Communication

In some instances a GJO contractor employee may be required to work alone and/or after hours within the Hanford Tank Farms. The Project Coordinator will ensure that a two-way radio or cellular phone is available to GJO contractor employees during logging operations at the Hanford Tank Farms. A current list of emergency phone numbers will also be posted in each logging truck.

9.5.3 Accident Prevention Responsibilities

Only qualified employees, by training or experience, will operate machinery and equipment. All manufacturer guidelines for safe operation, inspection, or repair of equipment will be followed.

Personnel should always be alert for unsafe conditions or environments. Should unforeseen health safety hazards be encountered, HSC and the GJO contractor management will be notified immediately and additional controls will be implemented as necessary.

Every employee is responsible for exercising stop-work authority when observing an act that may result in an imminent life-threatening or hazardous situation.

9.5.4 Eye and Face Protection

Employees will wear appropriate eye and face protection equipment when machines or operations present potential eye or face injury from physical or chemical agents. Eye and face protection shall be certified and marked by the manufacturer as meeting the requirements of ANSI Standard Z87.1 and Z87.1A (current edition), "Practice for Occupational and Educational Eye and Face Protection."

Personnel may be required by the HSC to don safety glasses with side shields or goggles prior to entering the Hanford Tank Farms. The HSC will be responsible for notifying GJO contractor personnel of this requirement prior the issuing a tank farm access key.

9.5.5 Electrical

Personnel will ensure electrical equipment is free from hazards likely to cause physical harm or death to themselves or coworkers. All electrical equipment associated with the RAS should be in good working order with no defects and conform to the Electrical Safety Standard 2.7 provided in the *Grand Junction Office Health and Safety Manual* (GJO 2).

Every employee is responsible for exercising stop-work authority when observing an unsafe electrical hazard.

9.5.6 Unplanned Activities

If an unplanned activity is necessary and requires additional safety requirements, the GJO contractor Project Coordinator will coordinate with HSC to address safety concerns and requirements before work is performed.

9.5.7 Asbestos

GJO contractor personnel will not disturb any material they suspect may contain friable asbestos. Monitoring activities in the vicinity of the material suspected to be or containing friable asbestos will be suspended, and HSC will be notified of the material. Monitoring activities in the vicinity of non-friable asbestos (e.g., unbroken transit piping) will be continued at the discretion of HSC.

9.5.8 Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) will be maintained in the logging truck for all hazardous materials kept on the truck. All personnel utilizing these materials will be trained to the MSDS, as necessary, and training records will be maintained.

9.6 Vehicle Movement

A spotter is required during all vehicle movement within the Hanford Tank Farms. This is essential when backing the logging truck to the wellhead. Movement of the logging truck will be performed in accordance with the route specified on the HSC supplied route map. Before logging activities commence, the logging truck wheels will be chocked (at least one), and the emergency brake set.

10.0 Decontamination

10.1 Personnel Decontamination

Personnel decontamination will be performed by HSC personnel according to approved HSC procedures. Contamination of personnel is not expected; however, should personnel contamination be detected, the individual will be decontaminated before leaving the tank farm area. Most contamination can be removed using simple, non-abrasive techniques such as tape presses or soap and water. Decontamination for non-radiological concerns will conform to the Tank Farms HASP (DOE 1999).

10.2 Equipment Decontamination

Equipment decontamination will be performed by HSC personnel according to approved HSC procedures.

11.0 Emergency Response/Contingency Plan

The site-specific training will complement the information contained in this HASP. GJO contractor personnel will ensure the Hanford Tank Farms emergency actions are understood and followed.

11.1 Emergency Contacts and Phone Numbers

The Patrol Operations Center has been designated as the **single point-of-contact** to mobilize responses from support organizations for any emergency whether it is a fire, an accident, a spill, or otherwise. The single point-of-contact is available at all times **(911 or 373-3800, cellular)** and has the responsibility to initiate notifications as well as to dispatch emergency responders (Hanford Fire Department, Hanford Patrol, and ambulance services).

For non-emergencies, Table 11-1 provides useful phone numbers. The Project Coordinator will ensure Table 11-1 is posted in a conspicuous location in the logging truck.

Table 11-1. Useful Phone Numbers for Non-Emergencies

Position/Agency	Phone Number
Shift Office	373-3475
Patrol Operations Center	911 south of the Wye Barricade 911 or 373-3800 north of the barricade. NOTE: Cellular users dial 373-3800.
200 West Health Service Center (7:00 AM - 4:00 PM)	373-2714

11.2 Emergency Alarms

The Project Coordinator will ensure that Table 11-2, "Emergency Alarms," is posted in the logging truck. At the activation of an alarm or signal, the listed actions shall be followed.

Table 11-2. Emergency Alarms

Signal	Meaning	Actions to be Taken
Crash alarm telephone (steady ringing phone)	Emergency message	Lift receiver, do not speak, listen to caller and relay message(s) to building occupants and BED of alternate.
Gong or bell and flashing lights	Fire	Evacuate building. Move upwind. Keep clear of emergency vehicles.
Siren (steady blast)	Area evacuation	Proceed promptly to accountability area. Follow instructions.
Wavering (tone) siren	Take cover	Close all exterior doors, turn off all intake ventilation and notify manager of whereabouts. Request call back for status and monitor portable radios.

11.3 Take Cover

A take cover action is normally initiated by a crash alarm telephone message and activation of area and facility take cover sirens (wavering tone). During a take cover action, all personnel shall take cover in the nearest unlocked facility or vehicle.

A take cover action for the tank farms would be caused by one or more of the following:

- Actual or potential release of hazardous materials (radioactive or non-radioactive) to the environment by tank farms or other facilities.
- Natural emergencies (high winds, tornadoes, volcanic ash fall).
- A fire and/or explosion of a waste tank.
- Range fire.
- Security incidents (hostage situations, terrorist acts, etc.)

All personnel must remain within the facility during a take cover action. Essential personnel or person(s) in charge of the facility perform the following actions: ensure all doors and windows are closed, shut down ventilation systems, account for all personnel, report information to the shift manager/building emergency director, and, if required, shut down process operations.

People are stationed at entrance doors to ensure no one leaves and that anyone outside is allowed inside. If the take cover was due to a radioactive material release and a person enters the facility after the take cover alarms have stopped, that person is held at the entrance door until surveyed by HPTs.

For personnel within vehicles, the driver will ensure all doors and windows are closed, heater or air conditioners are off, vents are closed, and proceed to the nearest unlocked facility to take

cover. If the vehicle is not running, the person(s) will ensure all doors and windows are closed, turn on the headlights or overhead yellow flashing light, and wait for emergency response personnel assistance and instructions. When a take-cover action is initiated, the logging equipment should be shut down (do not attempt to remove the logging tool from the borehole) and personnel should follow take-cover procedures immediately. If the personnel are inside a tank farm they should immediately proceed to the change trailer.

11.4 Evacuation

Three types of evacuations can be performed at the Tank Farms: 1) controlled evacuation action, 2) timed evacuation, and 3) rapid evacuation. Normally all evacuations are preceded by take cover actions.

11.4.1 Controlled Evacuation

A controlled evacuation is ordered by the Emergency Control Center. A controlled evacuation is controlled for all affected facilities by the Emergency Control Center's Staging Area Director. If a controlled evacuation is ordered during logging operations, all equipment should be turned off and placed in a safe configuration prior to exiting the tank farm.

1. Staging Area Director contacts the Patrol Operations Center, via 911 or 373-3800, provides a crash alarm telephone message for facilities to begin evacuation sirens for 3 minutes, and conducts a controlled evacuation.

2. The Patrol Operations Center activates the crash alarm telephone system, provides the controlled evacuation message, then activates the affected 200 Areas' evacuation sirens for 3 minutes.

3. Upon crash alarm telephone notification evacuation sirens in 242-A, 272-AW, and 272-WA will be activated as required by operations personnel for 3 minutes.

4. Personnel in the tank farms and other radioactive control areas exit the radiation areas normally. Once surveyed, they can proceed to the evacuation staging area.

5. At the staging area the personnel inform the Staging Area Manager they came from radiation areas. The Staging Area Manager will ensure they are surveyed by HPTs. The personnel shall follow the instructions of the Staging Area Manager.

6. Upon notification of a controlled evacuation, the Staging Area Manager:

    - Separates the personnel with keys for private vehicles and their riders from other personnel, asks if the private vehicle can take additional riders who do not have transportation, and provides evacuation routes to the drivers and directs them to evacuate.

- Places the remaining personnel in government vehicles and directs them to evacuate.

11.4.2 Rapid Evacuation

A rapid evacuation is ordered by the Emergency Control Center (ECC) when conditions exist that are, or could become, life threatening to the affected area personnel. A rapid evacuation involves preparation by the ECC of the appropriate evacuation route, the location of the secondary staging (assembly) area, and the exact time to initiate evacuation sirens. If a rapid evacuation is ordered during logging operations, all systems will be turned off but left in their current configuration and personnel will take cover in the nearest change trailer. Once the evacuation plan is decided, the following actions are performed:

Note: Before an evacuation order, all personnel will be in a take cover (shelter) situation.

1. The Staging Area Director contacts the Patrol Operations Center and provides the crash alarm telephone message, evacuation routes, secondary staging point, and the time at which all evacuation sirens will be activated.

2. The Patrol Operations Center activates the crash alarm telephone system and provides the evacuation information, evacuation routes, location of secondary staging area, and time when the evacuation will be initiated (evacuation sirens activated).

3. Personnel taking cover in Tank Farms Change Trailer or Instrument/Control Buildings will be notified of the rapid evacuation by the assigned Accountability Director.

4. When evacuation sirens are activated, personnel will report to the 272-AW (200 East Area) or 272-WA (200 West Area) Buildings' lunchrooms.

5. At the lunchrooms, personnel will receive evacuation directions from the Operations Support Center Coordinator or Building Emergency Director (BED). Nonessential personnel will be directed to evacuate immediately.

6. The BED notifies essential personnel of evacuation duties, ensures transportation is arranged for nonessential personnel that do not have transportation, and ensures all nonessential personnel are evacuated upon activation of evacuation sirens.

11.4.3 Timed Evacuation

A timed evacuation (ordered by the BED) is a protective measure for Tank Farms personnel who are taking cover (sheltered) in a contaminated facility. Timed evacuations are initiated when immediate evacuation of the personnel is not necessary. Timed evacuations ensure that personnel are evacuated in a controlled manner to prevent unnecessary exposure or spreading of contamination. A timed evacuation is conducted by the Tank Farms emergency response organization. If a timed evacuation is ordered during logging operations, personnel will respond

in the same manner as a controlled evacuation. A timed evacuation can be conducted in two methods:

1. Personnel in the facility may be directed to put on available protective equipment and evacuate to a specific personnel survey location where HPTs will be waiting.

2. An evacuation team is assembled and evacuates the personnel from the facility via vehicles and radiological controls.

11.4.4 Single Building/Facility Evacuation

A single building/facility evacuation for any type of event, with the exception of an area evacuation or take cover, requires all personnel within the building/facility to evacuate upwind from the facility. Evacuation staging areas are not used for a single building/facility evacuation because it may be downwind of the event. If a single building/facility evacuation is ordered during logging operations, personnel shall immediately leave the area as directed.

The purpose for evacuating a single facility is:

- Release of hazardous materials (radioactive or non-radioactive) within the facility.
- Fire and/or explosion.
- High area radiation (radiation monitor alarm).
- Seismic event.
- Security events (bomb threats, hostile acts, etc.).
- Potential or actual loss of confinement/containment integrity.

Normally, all nonessential personnel are directed to evacuate or simply to leave the facility during any abnormal condition. This action is to ensure their safety and to get people out of the way of response personnel.

11.5 Fire Response Procedure

The following steps will be taken when a fire occurs at the project work site:

1. Contact the Patrol Operations Center using the available communications equipment (telephone or radio) and notify them of the situation.

2. Small, localized fires may be handled using the appropriate fire extinguisher to bring the occurrence under control.

3. Large, uncontrolled fires will be handled by the Hanford Fire Department. Evacuate and isolate the area and deny entry to unauthorized personnel.

4. If the fire involves material that could potentially release toxic gases, all persons in the immediate vicinity will be evacuated (sound the evacuation alarm), then the fire department will be notified of the potential toxic gas hazard.

11.6 Notification and Reporting

The employee that discovers the emergency is responsible for immediately reporting the situation by most expeditious means available to the Project Coordinator and HSC. The Project Coordinator will provide immediate verbal notification followed by written notification of any serious or potentially serious unplanned events and conditions. This notification will be sent to the Tank Farm Shift Manager at 376-2689 (East Area) or 373-3475 (West Area).

GJO contractor management will be notified promptly (within 1 hour). The Project Coordinator will complete and forward or fax a Safety Report (GJO Form 1743e) to the Project Safety Office (PSO) within 1 working day of the event and provide a copy of the form to the HSC. Other reports may be required (i.e., personal injuries/illness or automobile accidents) as described in the *Grand Junction Office Health and Safety Manual* (GJO 2).

As operator of the Tank Farms, HSC will be responsible for reporting under the DOE Occurrence Reporting and Processing System (ORPS). The GJO contractor will assist HSC in the development of GJO contractor-related ORPS reports. The GJO contractor will provide qualified personnel to assist in any required investigations.

11.7 Emergency Response Equipment

11.7.1 Communications Equipment

Cellular telephones or two-way radios will be kept in the logging truck for communication with Emergency Response personnel.

11.7.2 Fire Suppression

The Project Coordinator will ensure that a 10-pound or greater BC-Rated, dry chemical fire extinguisher is available in the logging truck. All portable fire extinguishers shall be tested, inspected, and maintained in accordance with (HNF-RD-7899, Rev. 0), *Fire Protection System Testing/Inspection/Maintenance/Deficiencies.*

11.7.3 First Aid Kits

First aid kits will be maintained in each support vehicle. The kits will conform to Occupational Safety and Health Administration (OSHA) requirements and contain the items listed in

Table 11-3. All injuries will be reported to the Project Coordinator and the individual will report immediately to the nearest first aid station.

Table 11-3. Approved First Aid Kit Contents

First Aid Kit Components		Quantity
Bandages	3-in. Ace	2
	3-in. Kling	2
	Band-Aids	20
	Triangular Bandage	2
	Oval size pads	2
	4-in. Bandage Compress	2
Tape	2-in. Adhesive (duct tape)	1
	2-in. Paper	1
Disposable Gloves		3
Betadine Wipes		2
Scissors		1
Thumb Forceps		1
Instant Cold Pack		1
Splints	Wire	1
	Finger	2
Irrigation Water	Eye	2
	Other	2
Ointments – Neosporin		5
Paper Cups		3
Goggles		2
Mouth Shields		2
Gowns		2
Disposable Bio-Hazard bag		1

12.0 Confined Space Entry

12.1 Evaluation

No confined space entry is anticipated for the Hanford Tank Farms Vadose Zone Monitoring Project.

13.0 Spill Containment

No tasks specific to the Hanford Tank Farms Vadose Zone Monitoring Project require controls for spill containment. However, should a spill of any hazardous material (e.g., petroleum products via a leaking gas tank or broken crank case) occur, then personnel should attempt to stop the spill and minimize its extent (e.g., pushing dirt up around the spill to contain it). Immediately notify Patrol Operations Center at 373-3800 and the Project Coordinator. Contact HSC to provide assistance for spill clean up and proper disposal.

References

AHJA Report, 2001, TF-1113, Rev. 0, Richland, Washington.

Fire Protection System/Inspection/Maintenance/Deficiencies, 2002, HNF-RD-7899, Rev. 1, Richland, Washington.

General Administrative Procedures Manual, STO-100, Grand Junction, Colorado.

Grand Junction Office Health and Safety Manual, GJO 2, Grand Junction, Colorado.

Heat Stress Control, 2000, HNF-IP-0842, Vol. 9, Section 4.25, Richland, Washington.

U.S. Department of Energy (DOE), 1999. *Tank Farms Health and Safety Plan*, HNF-SD-WM-HSP-002, Rev. 3B, prepared by Lockheed Martin Hanford Corporation for U.S. Department of Energy, Richland, Washington.

_____, 2000. *Project Hanford Radiological Control Manual*, HNF-5173, Rev. 0, prepared by Fluor Hanford, Inc. for the U.S. Department of Energy Assistant Secretary for Environmental Management, Richland, Washington.

_____, 2003a. *Hanford Geophysical Logging Project, Project Management Plan,* GJO-HGLP 1.6.2, Rev. 0, prepared by S.M. Stoller Corp. for the Grand Junction Office, Grand Junction, Colorado.

_____, 2003b. *Hanford Tank Farms Vadose Zone Monitoring Project, Baseline Monitoring Plan,* GJO-HGLP 1.8.1, Rev. 0, prepared by S.M. Stoller Corp. for the Grand Junction Office, Grand Junction, Colorado.